

Appln No. 09/650,275

Amdt date April 26, 2004

Reply to Office action of October 27, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A die seal structure for a semiconductor die having a substrate comprising:

an elongate region ~~electrically isolated from the remainder of the substrate~~ extending around a major portion of the periphery of the substrate and having a gap between ends of the elongate region along a minor portion of the periphery, the elongate region being electrically isolated from the remainder of the substrate except at the gap; and

a passive conductive seal ring extending around the entire periphery of the die in direct contact with the die along said elongate region and in direct contact with ~~[[said]] the substrate at the gap to provide a limited electrical connection between the ring and the substrate only at said gap.~~

2. (Original) The structure of claim 1 wherein the substrate has a first conductivity type, and wherein the elongate region comprises an elongate well region of a second conductivity type different from the conductivity of the first conductivity type.

3. (Original) The structure of claim 2 wherein the first conductivity type is p-type and the second conductivity type is n-type.

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4. (Original) The structure of claim 2 wherein the first conductivity type is n-type and the second conductivity type is p-type.

5. (Currently amended) The structure of claim 1 wherein the elongate region comprises an elongate dielectric region between the passive conductive seal ring and the substrate.

6. (Currently amended) The structure of claim 1 wherein the passive conductive seal ring only electrically contacts the substrate of the semiconductor die at the gap.

7. (Original) The structure of claim 1 wherein the substrate is formed of silicon.

8. (Currently amended) The structure of claim 1 wherein the passive conductive seal ring comprises a multilayer structure of alternating conducting and insulating layers, and wherein vias are formed in the insulating layers.

Claims 9-13 (Cancelled)

14. (Currently amended) A die seal structure for a semiconductor die having a substrate of a first conductivity type, comprising:

an elongate well region of a second conductivity type opposite from the first conductivity type extending around a

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major portion of the periphery of the substrate and having a gap between the ends of the elongate region along a minor portion of the periphery, the elongate well region being electrically isolated from the remainder of the substrate except at the gap and

a passive conductive seal ring extending around the entire periphery of the die in direct contact with the die along said elongate well region and in direct contact with said gap to ~~provide a limited electrical connection between the ring and the substrate of said first conductivity type only at at said gap.~~

15. (Original) The structure of claim 14 wherein the first conductivity type is p-type and the second conductivity type is n-type.

16. (Currently Amended) The structure of claim 14 wherein the first conductivity type is n-type [[n type]] and the second conductivity type is p-type [[p type]].

17. (Currently amended) The structure of claim 14 wherein the passive conductive seal ring comprises a multilayer structure of alternating conducting and insulating layers, and wherein vias are formed in the insulating layers.

18. (Currently amended) A semiconductor device comprising:
a. a die including a substrate;
b. a die seal structure on the substrate, the structure comprising:

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~~an elongate region electrically isolated from the remainder of the substrate extending around a major portion of the periphery of the substrate and having a gap between ends of the elongate region along a minor portion of the periphery, the elongate region being electrically isolated from the remainder of the substrate except at the gap; and~~

a passive conductive seal ring extending around the entire periphery of the die in direct contact with the die along said elongate region and in direct contact with said gap [to provide a limited electrical connection between the ring and the substrate only at said gap].

19. (Original) The structure of claim 18 wherein the substrate has a first conductivity type, and wherein the elongate region comprises an elongate well region of a second conductivity type different from the conductivity of the first conductivity type.

20. (Original) The structure of claim 18 wherein the first conductivity type is p-type and the second conductivity type is n-type.

21. (Original) The structure of claim 18 wherein the first conductivity type is n-type and the second conductivity type is p-type.

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22. (Currently amended) The structure of claim 18 wherein the elongate region comprises an elongate dielectric region between the passive conductive seal ring and the substrate.

23. (Currently amended) The structure of claim 18 wherein the passive conductive seal ring only electrically contacts the substrate of the semiconductor die at the gap.

24. (Original) The structure of claim 18 wherein the substrate is formed of silicon.

25. (Currently amended) The structure of claim 18 wherein the passive conductive seal ring comprises a multilayer structure of alternating conducting and insulating layers, and wherein vias are formed in the insulating layers.

26. (Original) The structure of claim 18 wherein the elongate region is isolated by oxide.

27. (Currently amended) The structure of claim 26 wherein the passive conductive seal ring is connected to the substrate by a metal stub.